

Patent claims

1. A DNA chip comprising a flat carrier (2) and, arranged along an array (3) of spots (4) containing catcher molecules, each spot (4) being assigned a microelectrode arrangement (5) for detecting binding events between the catcher molecules and target molecules applied by means of an analyte solution, characterized in that the electrode arrangement (5) is at least partially embedded in a hydrophilic reaction layer (14) which is permeable to target molecules and in which immobilized catcher molecules are distributed three-dimensionally.
2. The DNA chip as claimed in claim 1, characterized by a thickness of the reaction layer (14) of 2 to 100 μm .
3. The DNA chip as claimed in claim 2, characterized in that the reaction layer has a thickness laying approximately in the range of 1 to 5 L, where L is the sum of electrode width and electrode spacing.
4. The DNA chip as claimed in claim 2 or claim 3, characterized in that the electrode width and the electrode spacing lie in the region of 1 μm ($\approx 1000 \text{ nm}$) and in that the reaction layer has a thickness of between 2 and 10 μm .
5. The DNA chip as claimed in claim 3, the microelectrode arrangement being a two-pole system, characterized in that the reaction layer has a thickness of approximately 3 μm .
6. The DNA chip as claimed in claim 3, the microelectrode arrangement being a four-pole system, characterized in that the reaction layer has a thickness of approximately 7 μm .
7. The DNA chip as claimed in one of claims 1 to 6, characterized in that the reaction layer (14) is thermally stable up to approximately 95°C.

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8. The DNA chip as claimed in one of claims 1 to 7, characterized in that the reaction layer (14) contains coupling groups for the covalent binding of catcher molecules.

9. The DNA chip as claimed in one of claims 1 to 8, characterized in that the reaction layer (14) is a hydrogel.

10. The DNA chip as claimed in claim 6, characterized by an acrylamide-based radical-crosslinkable hydrogel with maleic anhydride and/or glycidyl (meth)acrylate as coupling groups.

11. The DNA chip as claimed in one of claims 1 to 10, characterized by an interdigital electrode arrangement (5).

12. The DNA chip as claimed in claim 11, characterized in that the interdigital electrode arrangement is a two-pole microelectrode system.

13. The DNA chip as claimed in claim 11, characterized in that the interdigital electrode arrangement is a four-pole microelectrode system.

14. The DNA chip as claimed in one of claims 1 to 13, characterized in that the flat carrier (2) comprises a semiconductor layer and an insulating layer (13) connected thereto, the latter carrying the electrode arrangement (5) and the reaction layer (14) on its side remote from the semiconductor layer.

15. The DNA chip as claimed in claim 14, characterized in that the semiconductor layer is a silicon layer (12).